

# Intel Express 10/100 Stackable Hub Management Module

*User Guide*



intel®

**This guide covers the following product:**

Intel Express 10/100 Stackable Hub - Management Module. Product code EE110MM.

**The Management Module supports the following products:**

Intel Express 10/100 Stackable Hub - 12-port TX hub. Product code EE110TX12.

Intel Express 10/100 Stackable Hub - 24-port TX hub. Product code EE110TX24.

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Intel Corporation, 5200 NE Elam Young Parkway, Hillsboro OR 97124-6497

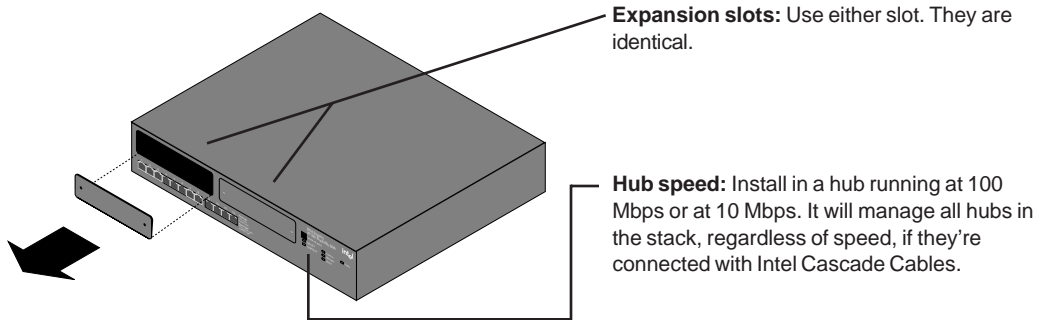
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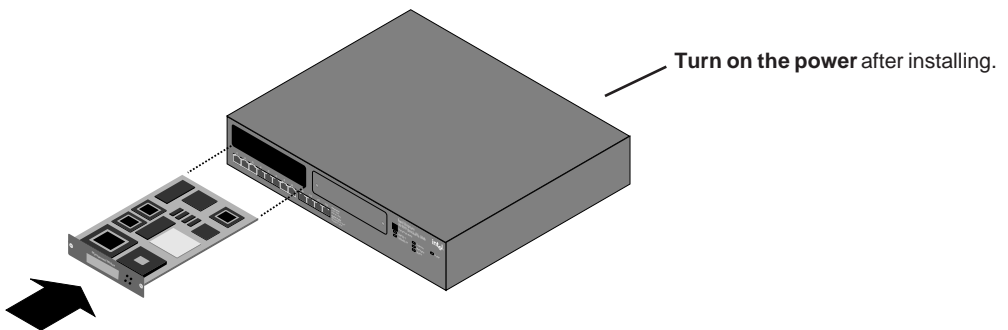
# Quick Start

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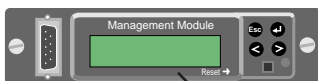
1. Turn off the power. Unscrew and remove the panel from an expansion slot on the Express 10/100 Stackable Hub.



2. Plug the Management Module into a slot, using the retaining screws to secure the module to the hub.



3. Set the IP configuration (none is assigned by default). You're now ready to manage hubs.



Use the LCD to quickly set the IP configuration.

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# 1

## Overview of Hub Management

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Hubs themselves are rarely the cause of problems on the network. However, since hubs are the center point for many devices on the network, it's a good place to start looking for problems.

There are four categories of management tasks:

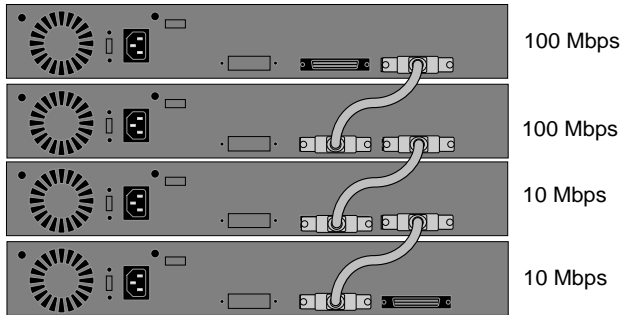
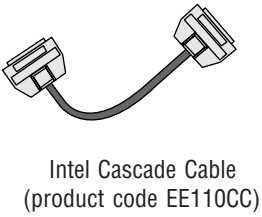
- Configuring the hub or stack of hubs. This includes setting the IP configuration, naming the hubs, and disabling individual ports.
- Monitoring traffic. This helps to plan network expansion or make segmenting decisions.
- Finding malfunctioning devices such as LAN adapters in PCs.
- Finding wiring problems between an attached device and the hub.

There are several methods for managing hubs. You can use any combination.

- Manage with the onboard LCD or Console Manager. This method works best for initial setup or when the network goes down and you can't access the hub with an SNMP application.
- Manage with Intel Device View for Web or LANDesk® Network Manager. These SNMP applications are tailored for Intel products and show a graphical representation of the hub.
- Manage with any other SNMP-compliant application. If you already use an SNMP application, you can manage hubs by compiling the hub's MIB files into that application. File locations are listed on page 51.

# Managing multiple hubs

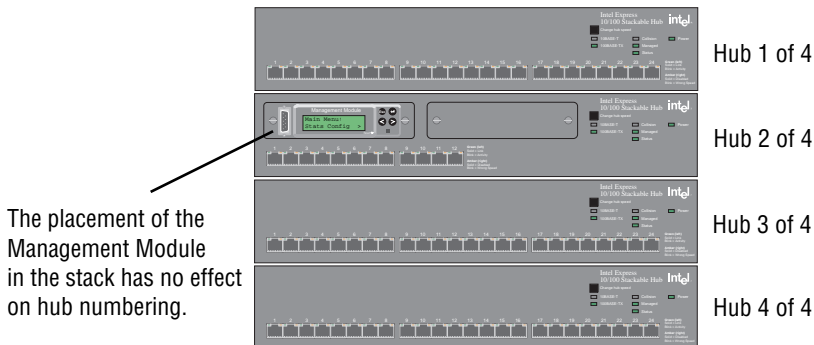
To manage multiple hubs, you must stack them using Intel Cascade Cables.



Connecting hubs with Intel Cascade Cables allows you to manage both 10 and 100 Mbps hubs with a single Management Module.

# Hub numbering

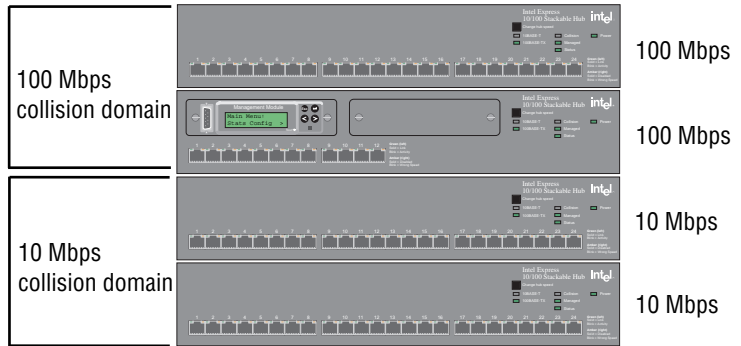
Once connected with Intel Cascade Cables, the Management Module numbers hubs from top to bottom, regardless of the placement of the Management Module.



The placement of the Management Module in the stack has no effect on hub numbering.

# Collision domain assignments

All hubs running at the same speed in the stack belong to the same collision domain. In the example below, all devices (PCs, print servers, and so on) connected to hubs 1 and 2 share 100 Mbps of bandwidth. All devices connected to hubs 3 and 4 share 10 Mbps of bandwidth.

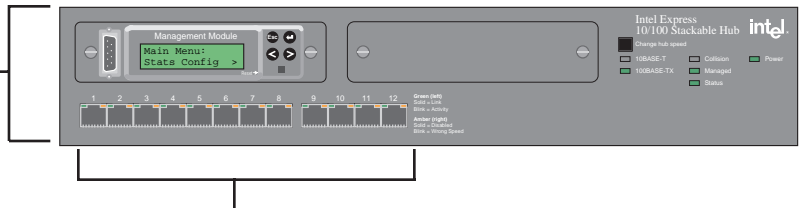


The two collision domains don't pass traffic to each other without optional bridging equipment (see the *Intel Express 10/100 Stackable Hub User Guide* that came with the hub for more information on bridging options).

# MIB identification

If you use a MIB browser, you can configure or view statistics for the hub at three levels – by hub (chassis), module, or port. The MIB file locations are listed on page 51.

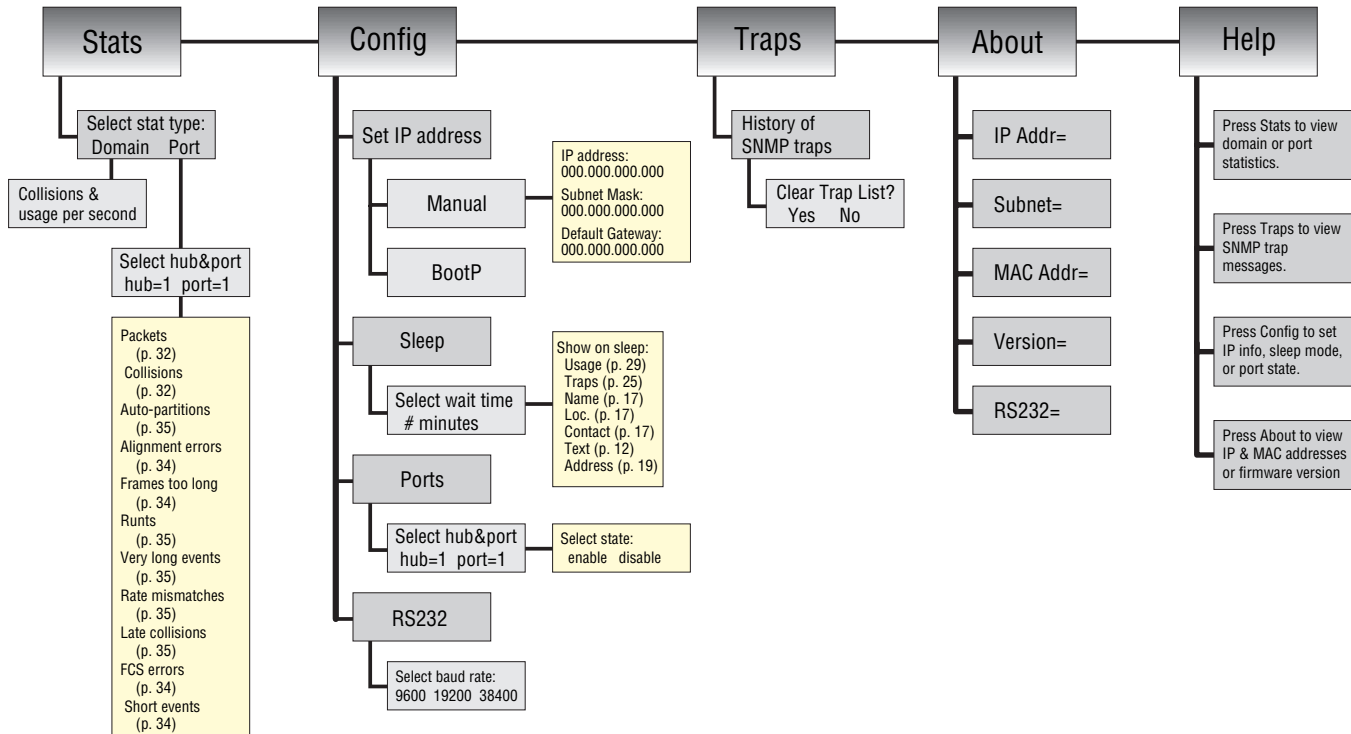
The entire hub is called the chassis.



The group of base ports on the hubs are called modules. The expansion slots are also modules.



# LCD menu tree

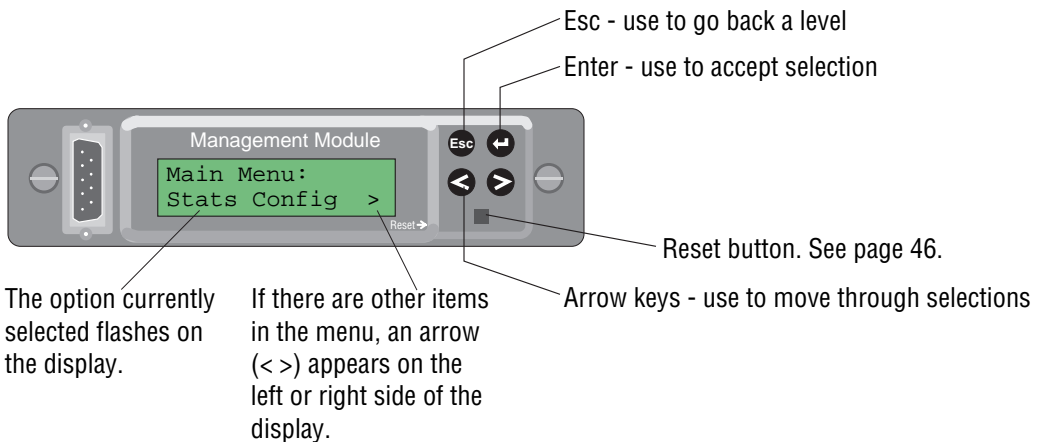


# 2

## Using the LCD

### Navigating

The Management Module has four buttons and an LCD display, which you can use to display information about your network or to make changes to the module, hub, or stack.



## Changing the LCD contrast

You can change the contrast so the display is viewable from different angles. For example, if the management module is located in a hub at the top of a rack.

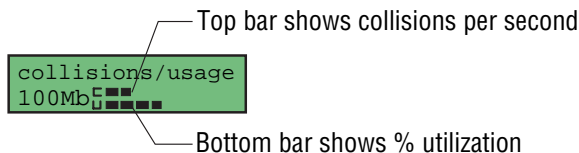
- Make sure the **Main** menu is displayed with the **Stats** item flashing.
  - To darken: Press the Esc button for five seconds to enter contrast mode. Keep pressing until the display turns darker.
  - To lighten: Press the left arrow button for five seconds to enter contrast mode. Keep pressing until the display turns lighter.

## Viewing statistics

From the **Stats** menu, select the stat type, **Domain** or **Port**. Press **↵**

### Domain

- 1 Collisions & usage per second appears. Press **↵** to display the following graph. If there are two collision domains (10 and 100 Mbps hubs in the same stack) two graphs will be displayed.




Each segment represents a value of 10 (each pixel within a segment is a value of 2). In this example, the 100 Mbps collision domain is 34% utilized and the collision count is 16 collisions per second.





- 2 Press any key to return to the **Main** menu.

### Port

- 1 Use the arrow keys to select the hub (from 1 to 8). Press **↵**
- 2 Use the arrow keys to select the port number (1 to 12 or 1 to 24). Press **↵**



- 3 Use the arrow keys to step through the different stats —packets, collisions, auto-partitions, alignment errors, frames too long, runts, very long events, rate mismatches, late collisions, FCS errors, short events. While viewing a statistic, you can update by pressing . For more information on these statistics, see pages 31-35.

## Changing the IP configuration

- 1 From the **Config** menu, select **Set IP**. Press .
- 2 Select **OK** to continue or **Cancel** to return to the **Main** menu. Press .
- 3 Select **Manual** or **BootP**. Press 
  - If you selected **Manual**, use the arrow keys to scroll through the range of values for each number, pressing  to set.
  - If you selected **BootP**, the Management Module searches for a BOOTP server.
- 4 (**Manual**) Repeat step 3 for the Subnet mask and Default gateway.
- 5 When you're finished, press the Reset button. This resets the Management Module and all hubs in the stack. When the hub resets, attached devices temporarily lose connection, but the links are automatically re-established when the hub is back up.

## Setting the sleep mode

Sleep mode displays information on the LCD when you leave it unattended – like a screen saver.

- 1 From the **Config** menu, select **Sleep**.
- 2 Set the wait time (time before sleep mode starts). You can set the delay from 1 to 255 minutes. A setting of 0 turns off the sleep mode. Press .
- 3 Choose what you want to display during sleep mode. Use the arrow keys to select one of the options below. Press .

**Usage:** The percent utilization of the collision domain or domains.

**Traps:** A list of error conditions on the hub. For a list of supported traps, see page 25.

**Name, Loc. (Location), or Contact:** For more information on these options, see page 17.

**Text:** User-defined text set via SNMP through LANDesk Network Manager or Device View for Web. Up to 32 characters can be displayed on the LCD.

**Address:** The current IP address of the Management Module.

- 4 Choose **Yes** if you want the management module to sleep now or **No** to return to the **Config** menu. Press **↵**

## Disabling a port

- 1 From the **Config** menu, select **Ports**. Press **↵**
- 2 Use the arrow keys to select the hub (from 1 to 8). Press **↵**
- 3 Use the arrow keys to select the port number (from 1 to 12 or 1 to 24). Press **↵**
- 4 Select **Enable** or **Disable** using the arrow keys. Press **↵**
- 5 Press any key to return to the **Config** menu.

## Setting the serial port baud

- 1 From the **Config** menu, select **RS232**. Press **↵**
- 2 Use the arrow keys to change the baud (**9600**, **19200**, or **38400**). Press **↵** to set.
- 3 Press any key to return to the **Config** menu.

## Viewing trap messages

- 1 From the **Main** menu, select **Traps**. Press **↵**
- 2 Use the right arrow key to view the traps.
- 3 At the end of the list choose whether you want to clear the trap list. Use the arrow keys to select **Yes** or **No** and press **↵**.

For a list of supported traps, see page 25.

## Viewing About information

- 1 From the **Main** menu, select **About**. Press **↵**
- 2 Use the arrow keys to view the IP address, Subnet mask, MAC address, Version (software version of Management Module), and RS232 baud.





# Navigating

See below for navigation tips. On the top screen (see the next page) you can press the number of the menu item to select it. For example, selecting 1 will display the System Configuration screen.

```
-----  
System Configuration  
-----  
  
Stack configuration  
Name: [Engineering ]  
Location: [4th floor wiring closet ]  
Contact: [Eric@555-1234 ]  
  
    <IP configuration >  
    <SNMP configuration>  
  
Individual hub configuration  
Hub: [1 of 2]  
Name: [Main server users ]  
Number: [asset#: 48927FE ]  
Type: [24-port 10/100 Repeater ]  
Speed: [100 Mbps]  
  
=====
```

↑↓ or Tab ↹: Moves up or down to the next menu item. For example, pressing ↓ moves from Name: to Location:.

↵: Selects a menu item. For example, pressing ↵ here takes you to the IP configuration screen.

←→ or Spacebar: Moves to next selection within a menu item. For example, pressing → moves from 100 Mbps to 10 Mbps.

```
=====
```

Sets a name for identification purposes.

```
Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh  
=====
```

## toggling between insert and overstrike mode

By default, the Console Manager is in overstrike mode, which means typing in a field replaces existing characters. Press **Ctrl+O** to change to insert mode.



## Top screen (main)

```
-----  
Intel Express 10/100 Stackable Hub Console Manager  
-----  
  
1. System configuration  
2. Port configuration  
3. Collision domain statistics  
4. Port statistics  
5. Network health checks  
6. Login, security, and reset options  
7. About  
8. Logout  
-----  
Sets IP configuration, SNMP community strings, identification options.  
Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh  
-----
```

The Top screen is the starting point for all other Console Manager screens. Type the number of a screen to display it (for example, pressing 4 displays the Port Statistics screen). Or use the **↑****↓** arrow keys and **↵** to display the menu.

To return to the Top screen at any time, press **Ctrl****T**.

# System Configuration screen

```
-----
                        System Configuration
-----

Stack configuration
Name: [Engineering ]
Location: [4th floor wiring closet ]
Contact: [Eric@555-1234 ]

        <IP configuration >
        <SNMP configuration>

Individual hub configuration
Hub: [1 of 2]
Name: [Main server users ]
Number: [asset#: 48927FE ]
Type: [24-port 10/100 Repeater ]
Speed: [100 Mbps]

=====
Sets a name for identification purposes.

Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh
=====
```

## Location

Top screen

1. System Configuration

## Uses

**Name:** Assigns a name to the entire system (Management Module plus all hubs in the stack). You can use up to 255 characters.

This sets the value for **Name** in the LCD sleep mode (see page 11). The LCD displays only the first 16 characters.

**Location:** Assigns a location to the entire system (Management Module plus all hubs in the stack). You can use up to 255 characters.

This sets the value for **Loc.** in the LCD sleep mode (see page 11). The LCD displays only the first 16 characters.

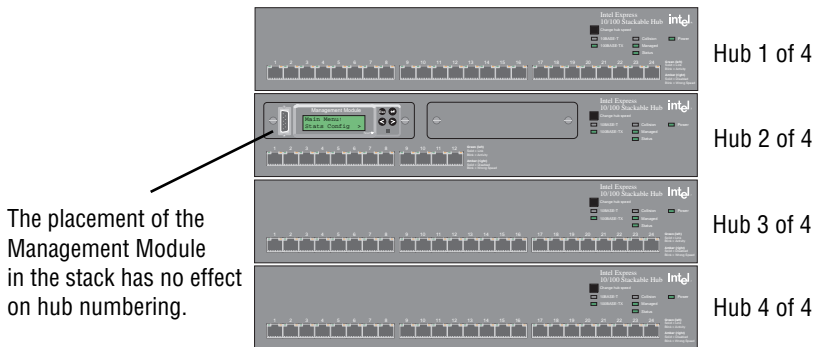
**Contact:** Assigns a contact person or phone number to the entire system (Management Module plus all hubs in the stack). You can use up to 255 characters.

This sets the value for **Contact** in the LCD sleep mode (see page 11). The LCD displays only the first 16 characters.

**<IP configuration>:** Press **[Enter]** to display the IP Configuration screens.

**<SNMP configuration>:** Press **[Enter]** to display the SNMP Configuration screens.

**Hub:** Use **[Left/Right]** or **[Spacebar]** to select the number of the hub in the stack. The hub at the top of the stack is number one. The location of the Management Module in the stack has no effect on hub numbering.



**Name:** Assigns a name to an individual hub. Use up to 24 characters.

**Number:** Assigns a number to the hub. Use up to 24 characters. This setting is not related to hub numbering.

**Type:** Displays the manufacturer-assigned type of hub. You can change this to whatever you'd like. Use up to 24 characters.

**Speed:** Use **[Left/Right]** or **[Spacebar]** to change the speed on the selected hub. The change takes effect immediately. Remember that all ports on a hub operate at the same speed. All devices attached to the hub must match that speed.

## NOTE

Changing the speed of a hub resets all statistical counters for all hubs, regardless of speed .

# Local IP Configuration screen

```
-----  
Local IP Configuration  
-----  
Management Module MAC address: 00-A0-C9-3F-2C-3B  
  
Current settings                New local settings  
IP address: 134.134.179.227    IP address: [134.134.179.227]  
Subnet mask: 255.255.0.0      Subnet mask: [255.255. 0. 0]  
Default gateway: 0.0.0.0      Default gateway: [134.134.179.251]  
  
      <USE NOW>      <USE NEXT RESET>      <CANCEL>  
  
Note: If you enabled remote configuration (BOOTP), USE NOW and  
      USE NEXT RESET will disable BOOTP and use the New local settings  
      defined here. USE NOW will also reset the Management Module,  
      clearing all statistics.  
  
=====
```

Reset Management Module and use New local settings.

```
Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh  
=====
```

## Location

Top screen

1. System Configuration

<IP configuration>

<Configure IP locally>

## Uses

**Management Module MAC address:** Displays the unique manufacturer-assigned hardware address.

**Current settings:** Displays the IP configuration currently used by the Management Module. The IP address shown here is the one you'd use to access the Management Module through Telnet or a ping test.

**IP address:** The unique user-assigned network address for the Management Module.

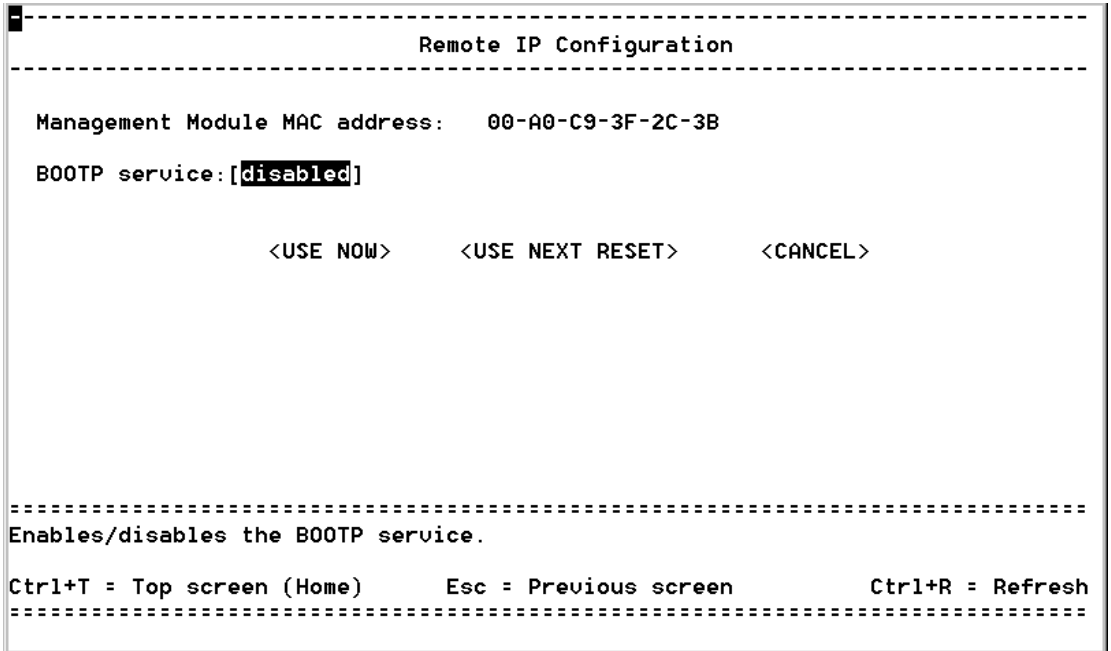
**Subnet mask:** Should match the subnet mask of other devices on your network.

**Default gateway:** The IP address of the device that routes to different networks. Typically a router or routing server.

**New settings:** Use to assign a new IP configuration to the Management Module.

- Choose **<USE NOW>** to reset the Management Module and use the new local settings immediately. You'll have to log in again if you choose **<USE NOW>**.
- Choose **<USE NEXT RESET>** to save the new local settings. The settings take effect when you reset the Management Module using the menu item or front panel button.
- Choose **<CANCEL>** to clear the new settings and return to the previous menu.

# Remote IP Configuration screen



## Location

Top screen

1. System Configuration

<IP configuration>

<Configure IP remotely (BOOTP)>

## Uses

**Management Module MAC address:** Shows the unique manufacturer-assigned hardware address. To use BOOTP, you must enter this address into your BOOTP server.

**BOOTP service:** Use **[+]** or **[Spacebar]** to change to **enabled** to have the Management Module look for a BOOTP agent on a server to obtain its IP address. You must first set up the BOOTP server.

Select **disabled** to have the Management Module use the IP configuration specified in the Local IP Configuration screen.

- Choose **<USE NOW>** to reset the Management Module and find the BOOTP server immediately. You'll have to log in again if you press **<USE NOW>**.
- Choose **<USE NEXT RESET>** to save the setting. The settings take effect when you reset the Management Module using the menu item or front panel button.
- Press **<CANCEL>** to return to the previous menu.





## Trap Receiving Stations screen

```
-----  
                          Trap Receiving Stations  
-----  
  
1. [134.134.179. 15] [enabled ] [private ]  
2. [134.134.179. 56] [enabled ] [private ]  
3. [134.134.179. 23] [enabled ] [private ]  
4. [ . . . ] [disabled] [ ]  
5. [ . . . ] [disabled] [ ]  
6. [ . . . ] [disabled] [ ]  
7. [ . . . ] [disabled] [ ]  
8. [ . . . ] [disabled] [ ]  
9. [ . . . ] [disabled] [ ]  
10. [ . . . ] [disabled] [ ]  
  
=====
```

Enter the IP address of a PC with an SNMP management application installed.

```
Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh  
=====
```

### Location

Top screen

1. System configuration

<SNMP configuration>

<Define trap receiving stations>




### Uses

Enter the IP addresses of PCs with SNMP management applications (such as LANDesk Network Manager) installed. When a trap occurs, such as a speed change on a hub, the Management Module automatically alerts the SNMP management application.

Supported traps include:

- notification of utilization exceeding a defined percentage or collisions exceeding a defined number (configurable in LANDesk Network Manager). Also configurable by using a MIB browser to edit these objects in iee110.mib:
  - rpPtrDomainUtilizationTrapThreshold
  - rpPtrDomainUtilizationTrapPeriod
  - rpPtrDomainCollisionTrapThreshold
  - rpPtrDomainCollisionTrapPeriod
- notification of a hub configuration change, such as a speed change or an unplugged Cascade Cable.
- notification of a hub power cycled or reset.

**IP address fields:** Sets the IP addresses of PCs with SNMP applications installed.

**enabled/disabled:** Select **enabled** to have the Management Module send traps to that IP address. Select **disabled** to prevent the Management Module from sending traps to that IP address. Use   or  to toggle between the two choices.

**Trap community string fields:** Sets the community string that must match the trap community string in the SNMP application.

# Port Configuration screen

```
-----
                        Port Configuration
-----
Hub: [2 of 2]      Disable/enable port: [ 1]  <DISABLE>
Speed: 100 Mbps

Port   Status   Link           Port   Status   Link
  1    OK       No             13-Slot OK    No
  2    OK       No             14-Slot OK    Yes
  3    OK       Yes
  4    OK       No
  5    OK       Yes
  6    OK       No
  7    OK       No
  8    OK       No
  9    OK       Yes
 10    OK       No
 11    OK       No
 12    OK       No
=====
Select hub in stack. The hub at the top of the stack is hub 1.
Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh
=====
```

## Location

Top screen

2. Port configuration

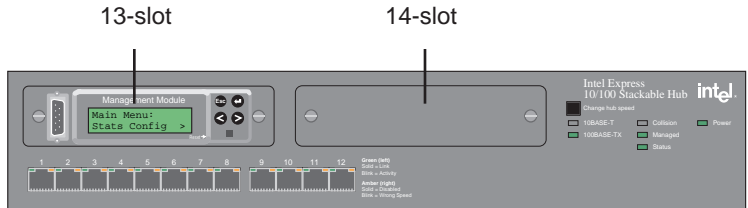
## Uses

**Hub:** Use **←→** or **Spacebar** to select the number of the hub in the stack. The hub at the top of the stack is number one. The location of the Management Module in the stack has no effect on hub numbering.

**Disable/enable port:** Use **←→** or **Spacebar** to select the hub port. Press **↵** on **<DISABLE/ENABLE>** to disable or enable the port. Check the status column to see if the port is disabled or OK (enabled).

**Speed:** Displays the speed of the hub selected in the **Hub:** field.

**Port:** Displays the port number on the hub selected in the **Hub:** field. Ports **13-Slot** and **14-Slot** on a 12-port hub refer to the two expansion slots. If you're facing the hub, the left slot is port 13 and the right slot is port 14.



**Status:** Displays the current functional state of the port. Possible values are:

**OK:** The port is functioning normally.

**disabled:** The port was manually disabled (see **Disable/enable port**). The port cannot establish a link with a device again until it's enabled.

**partitioned:** The port was automatically disabled by the hub due to an error condition, such as 64 consecutive collisions. The port will be automatically enabled when the condition clears.

**wrong speed:** The device attached to the hub is operating at 10 Mbps while the hub is operating at 100 Mbps, or vice-versa.

**Link:** Indicates whether a device is properly connected to the port.

## Collision Domain Statistics screen

```
-----
                          Collision Domain Statistics
-----
Update interval: [ 5 sec]
Collision domain: [100 Mbps]

Utilization                4%
Collisions                  571
Frames                     1654766
Octets                     411251966

FCS errors                  16      Runts                3760
Alignment errors           34      Auto partitions      0
Frames too long             1
Short events                6196
Late events                 47
Very long events            0
Rate mismatch               0
Total errors                6294
=====
Sets the polling interval.

Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh
=====
```

### Location

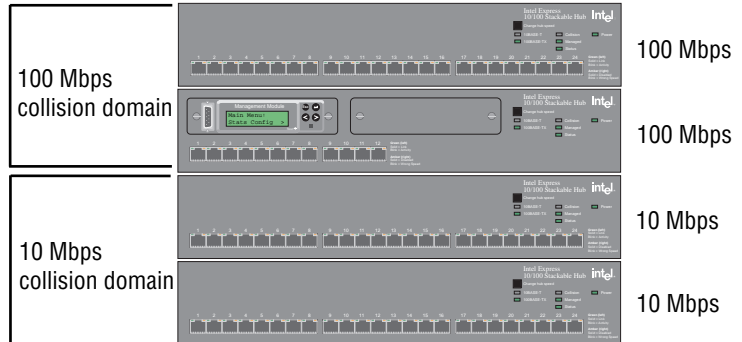
Top screen

3. Collision domain statistics

### Uses

**Update interval:** Selects the time period between updates. For example, an Update interval of 5 sec. means the Console Manager collects and displays information from the Management Module every five seconds.

**Collision domain:** Selects which collision domain (10 or 100 Mbps hubs) to view. All hubs in the stack running at the same speed are in the same collision domain.



**Utilization:** The percentage of Ethernet bandwidth (10 or 100 Mbps) being used by devices attached to the hubs. All hubs in the stack running at the same speed are in the same collision domain and share either 10 or 100 Mbps of bandwidth.

**Collisions:** The number of collisions detected. Collisions are normal in an Ethernet network. They tend to rise as network utilization rises.

**Frames:** The number of frames detected without errors. Includes unicast, broadcast, and multicast frames. It does not include frames received with frames too long, runt, FCS, or alignment errors.

#### NOTE

Since frames vary in length, it's best to look at the octet count to see how much traffic is passing through the hubs.

**Octets:** The number of octets (bytes) contained in frames received that had no errors. This includes octets in unicast, broadcast, and multicast frames. It also includes octets after the start frame delimiter up to FCS, but not including FCS octets.

**FCS errors:** The number of frames detected that are free of partial octets and do not pass the FCS check. Usually caused by adapter underrun (when the adapter can't get enough PCI bandwidth). FCS errors do not necessarily indicate that data has been lost.

**Alignment errors:** The number of frames detected that contain partial octets and do not pass the FCS check. This is usually caused by a faulty adapter or poor quality cabling.

**Frames too long:** The number of frames detected that exceed the maximum permitted frame size of 1518 octets.

**Short events:** The number of fragments detected with ActivityDuration less than ShortEventMaxTime (greater than 74 bit times and less than 82 bit times). Usually indicates a network topology problem, such as connecting two Express hubs running at 100 Mbps with UTP cable (instead of Intel Cascade Cables in a stack) or using cables longer than 100 meters.

**Late events:** The number of collisions detected after the allowable detection period. Usually indicates a network topology problem, such as daisy-chaining two Express hubs running at 100 Mbps with UTP cable (instead of Intel Cascade Cables in a stack), daisy-chaining too many hubs running at 10 Mbps, or using cables longer than 100 meters.

**Very long events:** The number of times MAU jabber lockup protection (MJLP) was detected due to transmission of data that exceeded five msec. in duration (octet count greater than maxFramSize). This information can be useful in identifying faulty devices or ports.

**Rate mismatch:** A count of the occurrences of out-of-specification bit rates. This indicates the number of times the FIFO buffer overruns or underruns due to transmission rate errors. This could indicate an incorrect FIFO setting on a LAN adapter or a faulty LAN adapter.

**Total errors:** The total number of errors detected since the port was last reset. Total errors include FCS errors, alignment errors, frame too long, short events, late events, very long event, and rate mismatch errors.

**Runts:** The number of frames detected that are less than the minimum permitted frame size and have a good FCS. Runts usually indicate collision fragments, a normal network event.

**Auto partitions:** The number of times this port was automatically partitioned. This condition occurs when 64 consecutive collisions are detected on the port. These collisions are due to excessive traffic on the segment, a malfunctioning port, or a malfunctioning adapter that is jabbering.

## Port Statistics screen (traffic)

```
-----
                                Port Statistics
-----
Hub: [2 of 2]  Ports: [11-14]  Statistic: [traffic]  Update interval: [ 5 sec]
Speed: 100 Mbps  Type: 12-port 10/100 Repeater

Port          |    11    |    12    | 13 ($lot) | 14 ($lot) |
% Utilization |          0 |          0 |          0 |          1 |
Collisions    |          0 |          0 |          0 |         1286 |
Frames        |          0 |          0 |          0 |        19055 |
Octets        |          0 |          0 |          0 |       2185395 |

=====
Select hub in stack. The hub at the top of the stack is hub 1.

Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh
=====
```

### Location

Top screen

4. Port statistics

Statistic: [traffic]

### Uses

**Hub:** Use **←→** or **Spacebar** to select the number of the hub in the stack. The hub at the top of the stack is number one. The location of the Management Module in the stack has no effect on hub numbering.

**Ports:** Use **←→** or **Spacebar** to select the range of ports to view. The example above shows ports 11-14 on a 12-port hub. If you're facing the hub, ports 13 and 14 are the left and right expansion slots, respectively. See page 27 for an example.



**Statistic:** Use  or  to select the type of port statistics you want to view. Errors is the other type of statistic option you can view. See page 33.

**Update interval:** Use  or  to select the time period between updates. For example, an Update interval of 5 sec. means the Console Manager collects and displays information from the Management Module every five seconds.

**Speed:** Displays the current speed of the hub in the **Hub:** field.

**Type:** Displays the manufacturer-assigned type of hub. You can change this to whatever you'd like through the System Configuration screen (see page 17).

**% Utilization:** The percentage of Ethernet bandwidth (10 or 100 Mbps) the device attached to that port is using. All hubs in the stack running at the same speed are in the same collision domain and share either 10 or 100 Mbps of bandwidth.

**Collisions:** The number of collisions detected. Collisions are normal in an Ethernet network. They tend to rise as network utilization rises.

**Frames:** The number of frames detected without errors. Includes unicast, broadcast, and multicast frames. Does not include frames received with frames too long, runt, FCS, or alignment errors.

**Octets:** The number of octets (bytes) contained in frames received that had no errors. This includes octets in unicast, broadcast, and multicast frames. It also includes octets after the start frame delimiter up to FCS, but not including FCS octets.

## NOTE

Since frames vary in length, it's best to look at the octet count to see how much traffic is passing through the hubs.

## Port Statistics screen (errors)

```
-----
                        Port Statistics
-----
Hub: [2 of 2] Ports: [11-14] Statistic: [errors] Update interval: [ 5 sec]
Speed: 100 Mbps Type: 12-port 10/100 Repeater

Port          |   11   |   12   | 13 (Slot) | 14 (Slot) |
-----
FCS errors    |        0 |        0 |          0 |          0 |
Align errors  |        0 |        0 |          0 |          0 |
Frames too long |        0 |        0 |          0 |          0 |
Short events  |        0 |        0 |          0 |          0 |
Late events   |        0 |        0 |          0 |          9 |
Very long events |        0 |        0 |          0 |          0 |
Rate mismatch |        0 |        0 |          0 |          0 |
Total errors  |        0 |        0 |          0 |          9 |
Collisions    |        0 |        0 |          0 |        1286 |
Runts        |        0 |        0 |          0 |          0 |
Auto partitions |        0 |        0 |          0 |          0 |
-----
Show port error statistics.

Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh
-----
```

### Location

Top screen

4. Port statistics

Statistic: [errors]

### Uses

**Hub:** Use **←→** or **Spacebar** to select the number of the hub in the stack. The hub at the top of the stack is number one. See page 18 for an example.

**Ports:** Selects the range of ports to view. The example shows ports 11-14 on a 12-port hub. If you're facing the hub, ports 13 and 14 are the left and right expansion slots respectively. See page 27 for an example.

**Statistic:** Use **←→** or **Spacebar** to select the type of port statistics to view. Traffic is the other type of statistic option you can view (see page 31).

**Update interval:** Use **←→** or **Spacebar** to select the time period between updates. For example, an update interval of 5 sec. means the Console Manager collects and displays information from the Management Module every five seconds.

**Speed:** Displays the current speed of the hub in the **Hub:** field.

**Type:** Displays the manufacturer-assigned type of hub. You can change this to whatever you want through the System Configuration screen (see page 17).

**Collisions:** The number of collisions detected. Collisions are normal in an Ethernet network. They tend to rise as network utilization rises.

**Frames:** The number of frames detected without errors. Includes unicast, broadcast, and multicast frames. Does not include frames received with frames too long, runt, FCS, or alignment errors.

**Octets:** The number of octets (bytes) contained in frames received that had no errors. This includes octets in unicast, broadcast, and multicast frames. It also includes octets after the start frame delimiter up to FCS but not including FCS octets.

**FCS errors:** The number of frames detected that are free of partial octets and do not pass the FCS check. Usually caused by adapter underrun (when the adapter can't get enough PCI bandwidth). FCS errors do not necessarily indicate that data has been lost.

**Alignment errors:** The number of frames detected that contain partial octets and do not pass the FCS check.

**Frames too long:** The number of frames detected that exceed the maximum permitted frame size of 1518 octets.

**Short events:** The number of fragments detected with ActivityDuration less than ShortEventMaxTime (greater than 74 bit times and less than 82 bit times). Usually indicates a network topology problem, such as connecting two Express hubs running at 100 Mbps with UTP cable (instead of Intel Cascade Cables in a stack), or using cables longer than 100 meters.

## NOTE

Since frames vary in length, it's best to look at the octet count to see how much traffic is passing through the hubs.

**Late events:** The number of collisions detected after the allowable detection period. Usually indicates a network topology problem, such as daisy-chaining two Express hubs running at 100 Mbps with UTP cable (instead of Intel Cascade Cables in a stack), daisy-chaining too many hubs running at 10 Mbps, or using cables longer than 100 meters.

**Very long events:** The number of times MAU jabber lockup protection (MJLP) was detected due to transmission of data that exceeded 5 msec. in duration (octet count greater than maxFramSize). This information can help you identify faulty devices or ports.

**Rate mismatch:** A count of the occurrences of out-of-specification bit rates. This indicates the number of times the FIFO buffer overruns or underruns due to transmission rate errors. This could indicate an incorrect FIFO setting on a network adapter or a faulty adapter.

**Total errors:** The total number of errors detected since the port was last reset. Total errors include FCS errors, alignment errors, frame too long, short events, late events, very long event, and rate mismatch errors.

**Runts:** The number of frames detected that are less than the minimum permitted frame size and have a good FCS. Runts usually indicate collision fragments, a normal network event.

**Auto partitions:** The number of times this port was automatically partitioned. This condition occurs when 64 consecutive collisions are detected on the port. These collisions are due to excessive traffic on the segment, a malfunctioning port, or a malfunctioning adapter that is jabbering.

# Network Health Checks screen

```
-----  
                                Network Health Checks  
-----  
  
Device Checks:  
  <Check for wrong speed devices>  
  <Check for wrong polarity cabling to devices>  
  
Traffic Checks:  
  <Top traffic generators>  
  <Utilization and collision history (for up to last hour)>  
  
=====
```

Shows which ports have wrong speed devices connected.

```
Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh  
=====
```

## Location

Top screen

5. Network health checks

## Uses

**Device Checks:** Looks for connected devices that are operating at a speed opposite to the hub, or looks for cabling problems.

**Traffic Checks:** Looks for ports generating the largest volume of traffic (sorted by total octet count), or gives a history of the utilization percentage and collision count for up to the last hour.

# Wrong Speed Device screen

```
-----  
Wrong Speed Devices  
-----  
Update interval: [ 2 sec]      <Scroll Down> <Scroll Up>  
  
Hub  Port Last MAC addr  Problem  
1)  7   10  00A0C9000000  Hub set to 100 Mbps but device set to 10 Mbps  
  
=====
```

Sets the polling interval.

```
Ctrl+I = Top screen (Home)      Esc = Previous screen          Ctrl+R = Refresh  
=====
```

## Location

Top screen

5. Network health checks

<Check for wrong speed devices>

## Uses

**Update interval:** Use **←→** or **Spacebar** to select the time period between updates. For example, an update interval of 5 sec. means the Console Manager checks the Management Module every five seconds to see if it detected wrong speed devices.

**<Scroll Down>/<Scroll Up>** Moves up or down the list of wrong speed devices.

**Hub:** Displays the hub number in the stack where the wrong speed device was found. The hub at the top of the stack is number one.

**Port:** Displays the port number in the hub where the wrong speed device was found.

#### **NOTE**

All zeros are displayed in the Last MAC addr field if the Management Module never recognized the device on the port.

For example, the device plugged into the port was always at the wrong speed.

**Last MAC addr:** Displays the hardware address of the most recent device that sent data on that port. If all zeros are displayed, the Management Module never recognized the device on the port.

**Problem:** Displays the problem. In this screen, a wrong speed device is connected to port 10 of hub 7. Correct the problem by changing the speed of the attached device or by moving the device to a hub running at the same speed.

# Wrong Polarity Cabling screen

```
-----  
Wrong Polarity Cabling  
-----  
Update interval: [ 5 sec]      <Scroll Down> <Scroll Up>  
  
Hub  Port Last MAC addr  Problem  
  
No problems found  
  
===== Sets the polling interval.  
Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh  
=====
```

## Location

Top screen

5. Network health checks

<Check for wrong polarity cabling to devices>

## Uses

**Update interval:** Selects the time period between updates. For example, an Update interval of 5 sec. means the Console Manager will check the Management Module every five seconds to see if it detected wrong polarity cabling.

<Scroll Down>/<Scroll Up> Moves up or down the list of wrong polarity cabling devices.

**Hub:** Displays the hub number in the stack where the wrong polarity device was found. The hub at the top of the stack is number one.



**Port:** Displays the port number in the hub where the wrong polarity device was found.

#### **NOTE**

All zeros are displayed in the Last MAC addr field if the Management Module never recognized the device on the port.

For example, the device plugged into the port always had wrong polarity cabling between it and the hub.

**Last MAC addr:** Displays the hardware address of the most recent device that sent data on that port.

**Problem:** Displays what the problem is. In this screen, wrong polarity cabling between the device and the hub. Wrong polarity cabling is when the TX+ and TX- pairs or RX+ and RX- of a UTP cable are reversed. This is usually caused by making your own cables. If a wrong polarity cable is detected, try using a different cable.

## Top Traffic Generators screen

```
-----
                                Top Traffic Generators
-----
View for the last [ 1 minute ]   Domain: [100 Mbps]   Update interval: [ 5 sec]
                                <Scroll Down> <Scroll Up>

   Hub  Port  Last MAC address  Octets  Packets
1)  2     9    00E0F777F940      2772192  14738
2)  2     3    00AA00D105FB      1017284   6034
3)  2    14    00A0C93F2C3B       36853    306
4)  2     5    00A0C93F2789       4040     61

=====
Selects the time period to look back on.

Ctrl+T = Top screen (Home)      Esc = Previous screen          Ctrl+R = Refresh
=====
```

### Location

Top screen

5. Network health checks

<Top traffic generators>

### Uses

**View for the last:** Selects the time period to look back on.

**Domain:** Selects which collision domain (10 or 100 Mbps hubs) to view top traffic generating devices. All hubs in the stack running at the same speed are in the same collision domain.

**Update interval:** Selects the time period between updates. For example, an Update interval of 5 sec. means the Console Manager checks the Management Module every five seconds for the list of devices that are generating the most traffic.

**<Scroll Down>/<Scroll Up>** Moves up or down the list of top traffic generating devices.

**Hub:** Displays the hub number in the stack where the device is attached. The hub at the top of the stack is number one.

**Port:** Displays the port number in the hub where the device is attached.

**Last MAC addr:** Displays the hardware address of the most recent device that sent data on that port.

**Octets:** The number of octets (bytes) contained in frames received that had no errors. This includes octets in unicast, broadcast, and multicast frames. It also includes octets after the start frame delimiter up to FCS, but not including FCS octets.

**Frames:** The number of frames detected without errors. Includes unicast, broadcast, and multicast frames. Does not include frames received with frames too long, runt, FCS, or alignment errors.

## **NOTE**

If the MAC address changes with the update interval, another hub, switch, or router is probably connected to the port.

# Utilization and Collision History screen

```
-----
Utilization and Collision History
-----
View for the last [60 minutes]  Domain: [10 Mbps ]  Update interval: [ 2 sec]

-----
Utilization Breakdown-----  -----  Collisions/sec Breakdown___
0% to 9% | 41 min 16 sec          0 to 5 | 37 min 59 sec
10% to 19% | 18 min 44 sec        6 to 10 | 14 min 53 sec
20% to 29% |                      11 to 25 | 6 min 54 sec
30% to 39% |                      26 to 50 | 14 sec
40% to 49% |                      51 to 100 |
50% to 59% |                      101 to 200 |
60% to 69% |                      201 to 400 |
70% to 79% |                      401 to 800 |
80% to 100%|                      over 800 |
Total time | 60 min 0 sec          Total time | 60 min 0 sec
Minimum    | 6% 28 min 41 sec ago        Minimum    | 0 15 sec ago
Maximum    | 15% 1 min 54 sec ago        Maximum    | 42 20 min 15 sec ago
Average    | 9%                          Average    | 4
-----
Sets the polling interval.

Ctrl+T = Top screen (Home)      Esc = Previous screen          Ctrl+R = Refresh
-----
```

## Location

Top screen

5. Network health checks

<Utilization and collision history>

## Uses

**View for the last:** Selects the time period to look back on.

**Domain:** Selects which collision domain (10 or 100 Mbps hubs) to view. All hubs in the stack running at the same speed are in the same collision domain.

**Update interval:** Selects the time period between updates. For example, an Update interval of 5 sec. means the Console Manager checks the Management Module every five seconds for updated information.

**Utilization Breakdown:** Displays the amount of time the selected collision domain had a utilization percentage in the particular range. In the example, the 10 Mbps collision domain was at 0-9% utilization for 41 minutes and 16 seconds.

**Collisions/sec Breakdown:** Displays the amount of time the selected collision domain had a collision per second count in the particular range. In the example, the 10 Mbps collision domain had 0-5 collisions per second for 37 minutes and 59 seconds.

**Total time:** Displays the total amount of time the Management Module collected the history. If the total time is less than the **View for the last** value, then the Management Module or hub was probably reset or powered off.

**Minimum:** Displays the minimum utilization percentage or collision count for the time period.

**Maximum:** Displays the maximum utilization percentage or collision count for the time period.

**Average:** Displays the average utilization percentage or collision count for the time period.

## Interpreting this screen

It's best to view utilization coupled with collisions before making any decisions on the saturation of your network. Generally, Ethernet saturation starts to occur when the utilization reaches 30% and above. However, if the collision count is low, you don't have a saturated network, but an efficient network.

If both the utilization percentage and the collision count are consistently high (above 30% for utilization and 50-100 collisions/second or more), then you have a saturated network and will see poor performance. The best way to alleviate a saturated network is to segment the network (have fewer devices share a fixed amount of bandwidth). You can do this by adding a switch to the network.

# Login, Security & Reset Options screen

```
-----  
Login, reset, and security options  
-----  
  
Login settings  
  Username: [Kenny          ]   New password: [****          ]  
  Old password: [          ]   Confirm new password: [****          ]  
  
    <Save login settings> <Cancel>  
  
Reset options  
  Reset hub: [1 of 2]   <RESET>  
  Reset all 10 Mbps hubs <RESET>  
  Reset all 100 Mbps hubs <RESET>  
  Reset Management Module <RESET>  
  
Security options  
  Lock Change hub speed button(s) [off]  
  
===== Save any changes made to the username and password. =====  
Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh  
=====
```

## Location

Top screen

6. Login, security, and reset options

## Uses

**Username:** By default, no username is assigned. The one you specify here is used the next time you reset the Management Module or log out of the Console Manager. You can define only one username.

**Old password:** By default, no password is assigned. Leave this setting blank if you're assigning one for the first time.

**New password:** Sets a new password for accessing the Console Manager. The one you specify here is used the next time you reset the Management Module or log out and log in to the Console Manager.

**Confirm new password:** Ensures you entered what you thought you entered in the **New password** field.

**<Save login settings>:** Saves any changes to the Login settings. The next time you reset the Management Module or log out and log in again, you must use the new settings.

**<Cancel>:** Discards any unsaved changes to the Login settings. If you already selected **<Save login settings>**, selecting **<Cancel>** will do nothing.

**Reset hub:** Resets an individual hub. If the Management Module is in this hub, it will also be reset (if you changed the IP configuration or login setting, the new settings will be used).

**Reset all 10 Mbps hubs:** Resets all hubs operating at 10 Mbps in the stack. Think of this as a 10 Mbps collision domain reset. This does not reset the Management Module, even if it is in a hub running at 10 Mbps.

**Reset all 100 Mbps hubs:** Resets all hubs operating at 100 Mbps in the stack. Think of this as a 100 Mbps collision domain reset. This does not reset the Management Module, even if it is in a hub running at 100 Mbps.

**Reset Management Module:** Resets the Management Module. This resets all statistic counters back to zero. If you changed the IP configuration or login setting, the new settings are used.

**Lock Change hub speed button(s):** Prevents someone from changing the hub speed through the front panel button on the hub. Set to **on** to lock the button(s).

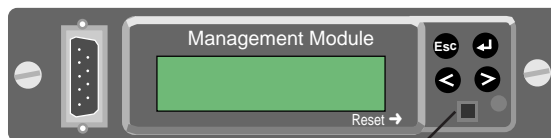
This setting is for all hubs in the stack. You can't lock the speed button for an individual hub unless you directly edit the MIB.

## NOTE

Resetting a hub causes devices connected to the hub to temporarily lose their link.

Resetting the Management Module doesn't result in lost links. However, it resets all statistic counters to zero.

## Front panel reset button



The front panel reset button resets the Management Module and all hubs in the stack, regardless of speed. All statistical counters are also reset.

# About screen

```
-----  
                          About  
-----  
  
IP address:           134.134.179.227  
MAC address:         00-A0-C9-3F-2C-3B  
Vendor name:         Intel  
Product name:        Express 10/100 Stackable Hub  
Hardware version:    fffffff-0ff  
Software version:    v0.6.0  
  
-----  
  
Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh  
-----
```

## Location

Top screen

7. About

## Uses

**IP address:** Displays the Management Module IP address currently in use.

**Management Module MAC address:** Displays the unique manufacturer-assigned hardware address. You can't change the MAC address.

**Vendor name:** Displays the Management Module manufacturer.



**Product name:** Displays the type of device the Management Module is supporting.

**Hardware version:** Displays the Management Module's hardware version. You can't update the hardware version. It's a good idea to write this information down and have it ready should you need to contact Intel Customer Support.

**Software version:** Displays the Management Module's software version. It's a good idea to write this information down and have it ready should you need to contact Intel Customer Support.

# Logout screen

```
-----  
Login Screen  
-----  
  
Enter username: [ ██████████ ]  
Enter password: [ ██████████ ]  
  
=====
```

Enter case-sensitive username. No username is assigned by default.

Ctrl+T = Top screen (Home)      Esc = Previous screen      Ctrl+R = Refresh

```
=====
```

## Location

Top screen

8. Logout

## Uses

Returns to the login screen.

# 4

## Technical Information

---

### Locating MIB files

The following Management Module MIB files are located on the Intel Device View for Web CD in the \MIB directory.

- intel.mib
- intelsys.mib
- iee110.mib

You can also download the MIB files from the Intel Customer Support Web site (<http://support.intel.com>).

### Defaults

#### Management Module (SNMP agent)

IP address:	None assigned
IP configuration source:	BOOTP disabled. Configure locally through LCD or Console Manager.
Read community:	Public
Write community:	Private

## **Hub**

Speed: 100 Mbps

Consecutive collisions before auto-partition: 64

## **LCD**

Sleep mode: Off

RS232 baud: 9600

## **Console Manager**

Communication parameters: 9600-8-N-1, no flow control

Username: None assigned

Password: None assigned

Typing mode: Overstrike. Use **Ctrl** **O** to change to insert.

# Limited Hardware Warranty

Intel warrants to the original owner that the hardware product delivered in this package will be free from defects in material and workmanship for three (3) years following the latter of: (i) the date of purchase only if you register by returning the registration card as indicated thereon with proof of purchase; or (ii) the date of manufacture; or (iii) the registration date if by electronic means provided such registration occurs within 30 days from purchase. This warranty does not cover the product if it is damaged in the process of being installed. Intel recommends that you have the company from whom you purchased this product install the product.

INTEL RESERVES THE RIGHT TO FILL YOUR ORDER WITH A PRODUCT CONTAINING NEW OR REMANUFACTURED COMPONENTS. THE ABOVE WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF NONINFRINGEMENT OF INTELLECTUAL PROPERTY, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY WARRANTY ARISING OUT OF ANY PROPOSAL, SPECIFICATION OR SAMPLE.

This warranty does not cover replacement of products damaged by abuse, accident, misuse, neglect, alteration, repair, disaster, improper installation or improper testing. If the product is found to be otherwise defective, Intel, at its option, will replace or repair the product at no charge except as set forth below, provided that you deliver the product along with a return material authorization (RMA) number either to the company from whom you purchased it or to Intel (North America only). If you ship the product, you must assume the risk of damage or loss in transit. You must use the original container (or the equivalent) and pay the shipping charge. Intel may replace or repair the product with either new or remanufactured product or parts, and the returned product becomes Intel's property. Intel warrants the repaired or replaced product to be free from defects in material and workmanship for a period of the greater of: (i) ninety (90) days from the return shipping date; or (ii) the period of time remaining on the original three (3) year warranty.

This warranty gives you specific legal rights and you may have other rights which vary from state to state. All parts or components contained in this product are covered by Intel's limited warranty for this product; the product may contain fully tested, recycled parts, warranted as if new. For warranty information call one of the numbers below.

## Returning a Defective Product (RMA)

Before returning any product, contact an Intel Customer Support Group and obtain an RMA number by calling:

North America only: (916) 377-7000

Europe only: +44-1793-404-900

Other locations: Return the product to the place of purchase.

If the Customer Support Group verifies that the product is defective, they will have the Return Material Authorization Department issue you an RMA number to place on the outer package of the product. Intel cannot accept any product without an RMA number on the package.

## LIMITATION OF LIABILITY AND REMEDIES

INTEL SHALL HAVE NO LIABILITY FOR ANY INDIRECT OR SPECULATIVE DAMAGES (INCLUDING, WITHOUT LIMITING THE FOREGOING, CONSEQUENTIAL, INCIDENTAL AND SPECIAL DAMAGES) ARISING FROM THE USE OF OR INABILITY TO USE THIS PRODUCT, WHETHER ARISING OUT OF CONTRACT, NEGLIGENCE, TORT, OR UNDER ANY WARRANTY, IRRESPECTIVE OF WHETHER INTEL HAS ADVANCE NOTICE OF THE POSSIBILITY OF ANY SUCH DAMAGES, INCLUDING, BUT NOT LIMITED TO LOSS OF USE, INFRINGEMENT OF INTELLECTUAL PROPERTY, BUSINESS INTERRUPTIONS, AND LOSS OF PROFITS, NOTWITHSTANDING THE FOREGOING. INTEL'S TOTAL LIABILITY FOR ALL CLAIMS UNDER THIS AGREEMENT SHALL NOT EXCEED THE PRICE PAID FOR THE PRODUCT. THESE LIMITATIONS ON POTENTIAL LIABILITIES WERE AN ESSENTIAL ELEMENT IN SETTING THE PRODUCT PRICE. INTEL NEITHER ASSUMES NOR AUTHORIZES ANYONE TO ASSUME FOR IT ANY OTHER LIABILITIES.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

Software provided with the hardware product is not covered under the hardware warranty described above. See the applicable software license agreement which shipped with the hardware product for details on any software warranty.

## **Federal Communications Commission (FCC) Statement**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

## **Manufacturer Declaration**

This certifies that the Intel Express 10/100 Stackable Hub complies with the EU Directive 89/33/EEC, using the EMC standards EN55022 (Class A) and EN50082-1. This product also meets or exceeds EN 60950 (TUV) requirements. This product has been tested and verified to meet CISPR 22 Class A requirements.

## **WARNING**

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## **WARNING**

The system is designed to operate in a typical office environment. Choose a site that is:

- Clean and free of airborne particles (other than normal room dust).
- Well ventilated and away from sources of heat including direct sunlight.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices.
- In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm.
- Provided with a properly grounded wall outlet.

Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

Ensure that the system is disconnected from its power source and from all telecommunications links, networks, or modems lines whenever the chassis cover is to be removed. Do not operate the system with the cover removed.

## **AVERTISSEMENT**

Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être:

- Propre et dépourvu de poussière en suspension (sauf la poussière normale).
- Bien aéré et loin des sources de chaleur, y compris du soleil direct.
- A l'abri des chocs et des sources de vibrations.
- Isolé de forts champs magnétiques générés par des appareils électriques.
- Dans les régions sujettes aux orages magnétiques il est recommandé de brancher votre système à un supresseur de surtension, et de débrancher toutes les lignes de télécommunications de votre modem durant un orage.
- Muni d'une prise murale correctement mise à la terre.

Ne pas utiliser ni modifier le câble d'alimentation C. A. fourni, s'il ne correspond pas exactement au type requis.

Assurez vous que le système soit débranché de son alimentation ainsi que de toutes les liaisons de télécommunication, des réseaux, et des lignes de modem avant d'enlever le capot. Ne pas utiliser le système quand le capot est enlevé.

## WARNUNG

Das System wurde für den Betrieb in einer normalen Büroumgebung entwickelt. Der Standort sollte:

- sauber und staubfrei sein (Hausstaub ausgenommen);
- gut gelüftet und keinen Heizquellen ausgesetzt sein (einschließlich direkter Sonneneinstrahlung);
- keinen Erschütterungen ausgesetzt sein;
- keine starken, von elektrischen Geräten erzeugten elektromagnetischen Felder aufweisen;
- in Regionen, in denen elektrische Stürme auftreten, mit einem Überspannungsschutzgerät verbunden sein; während eines elektrischen Sturms sollte keine Verbindung der Telekommunikationsleitungen mit dem Modem bestehen;
- mit einer geerdeten Wechselstromsteckdose ausgerüstet sein.

Versuchen Sie nicht, das mitgelieferte Netzkabel zu ändern oder zu verwenden, wenn es sich nicht um genau den erforderlichen Typ handelt.

Das System darf weder an eine Stromquelle angeschlossen sein noch eine Verbindung mit einer Telekommunikationseinrichtung, einem Netzwerk oder einer Modem-Leitung haben, wenn die Gehäuseabdeckung entfernt wird. Nehmen Sie das System nicht ohne die Abdeckung in Betrieb.

## AVVERTENZA

Il sistema è progettato per funzionare in un ambiente di lavoro tipico. Scegliere una postazione che sia:

- Pulita e libera da particelle in sospensione (a parte la normale polvere presente nell'ambiente).
- Ben ventilata e lontana da fonti di calore, compresa la luce solare diretta.
- Al riparo da urti e lontana da fonti di vibrazione.
- Isolata dai forti campi magnetici prodotti da dispositivi elettrici.
- In aree soggette a temporali, è consigliabile collegare il sistema ad un limitatore di corrente. In caso di temporali, scollegare le linee di comunicazione dal modem.
- Dotata di una presa a muro correttamente installata.

Non modificare o utilizzare il cavo di alimentazione in c. a. fornito dal produttore, se non corrisponde esattamente al tipo richiesto.

Prima di rimuovere il coperchio del telaio, assicurarsi che il sistema sia scollegato dall'alimentazione, da tutti i collegamenti di comunicazione, reti o linee di modem. Non avviare il sistema senza aver prima messo a posto il coperchio.

## ADVERTENCIAS

El sistema está diseñado para funcionar en un entorno de trabajo normal. Escoja un lugar:

- Limpio y libre de partículas en suspensión (salvo el polvo normal)
- Bien ventilado y alejado de fuentes de calor, incluida la luz solar directa.
- Alejado de fuentes de vibración.
- Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos.
- En regiones con frecuentes tormentas eléctricas, se recomienda conectar su sistema a un eliminador de sobrevoltage y desconectar el módem de las líneas de telecomunicación durante las tormentas.
- Previsto de una toma de tierra correctamente instalada.

No intente modificar ni usar el cable de alimentación de corriente alterna, si no se corresponde exactamente con el tipo requerido.

Asegúrese de que cada vez que se quite la cubierta del chasis, el sistema haya sido desconectado de la red de alimentación y de todos los enlaces de telecomunicaciones, de red y de líneas de módem. No ponga en funcionamiento el sistema mientras la cubierta esté quitada.

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